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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Jason K. Shiepe

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EXAMINER

CREPEAU, JONATHAN

ART UNIT

PAPER NUMBER

1746

DATE MAILED: 05/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/965,630

Applicant(s)

SHIEPE ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2,5-9,15-25,51 and 57-67 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 and 19 is/are allowed.
- 6) ☒ Claim(s) 2,5-8,15-17,20-25,51 and 57-67 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action addresses claims 2, 5-9, 15-25, 51, and 57-67. Claims 2, 5-7, 15-17, 20-25, 51, and 63-67 remain rejected for substantially the reasons of record. Claims 8 and 57-62 are newly rejected under 35 USC 103 as necessitated by amendment. Claims 18 and 19 are allowable and claim 9 is objected to but contains allowable subject matter. Accordingly, this action is made final.

### ***Claim Objections***

2. Claim 9 is objected to because of the following informalities: The preamble of the claim is "the electrochemical cell system of claim 2," however it appears that the claim was meant to be placed in independent form. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. Claims 2, 5-8, 20, 21 and 57-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand (U.S. Patent 6,030,718) in view of Wilson (U.S. Patent 5,641,586) in view of Speranza et al (WO 00/39363).

Fuglevand teaches a fuel cell comprising first and second electrodes (160), an electrolyte membrane (151), first and second flow fields, and porous flow field members (171, 172) in fluid communication with the flow fields (see Fig. 26). The member comprises a porous support having a series of layers (in layer 171) having a hydrophilicity gradient (see col.11, line 8). Layer 171 comprises particulate carbon and a hydrophobic polymer (e.g., PTFE) and/or a hydrophilic polymer (e.g., ionomer) and layer 172 comprises a carbon cloth integrated with polymer (see col. 9, line 42, col. 9, line 52, col. 10, line 66). Layer 171 comprises 20-90% of support material (i.e., particulate carbon).

However, the reference does not expressly teach that the porous supports comprise metal screens or sintered metal cloths, as recited in claim 21, or that such supports are made of Nb, Zr, Ta, Ti, steel, Ni, Co, and mixtures and alloys thereof as recited in claims 8 and 21.

Wilson et al. teach a fuel cell comprising first and second electrodes, an electrolyte membrane, first and second flow fields (12), and a porous flow field member (24) in fluid communication with the first flow field (see Fig. 1B). The member comprises a porous support modified to provide hydrophilicity or hydrophobicity (see col. 4, line 46 et seq). The porous support may comprise sintered particles, woven metal screens (cloths), and non-woven metal screens (see col. 5, line 10).

Therefore, the artisan would be motivated to use the structures of Wilson '586 in the fuel cell of Fuglevand because the disclosure of Wilson '586 indicates that metal screens and cloths are functionally equivalent to carbon cloths when used in porous current-collecting members for fuel cells. As such, it would be obvious to substitute the metal screens or cloths of Wilson '586

for the carbon paper of Fuglevand. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

Wilson does not expressly teach that the support is a sintered metal cloth. However, the artisan would be motivated to sinter the metal cloth of Wilson '586. Such a sintering step would serve to increase the structural integrity of the cloth because the fibers would be fused together. Further, as noted above, Wilson '586 teaches "sintered particles," therefore fairly suggesting such a sintering step.

Wilson further does not expressly teach that the flow field members comprise an electrically conductive material selected from the group consisting of Nb, Zr, Ta, Ti, steel, Ni, Co, and mixtures and alloys thereof.

Speranza et al. is directed to a screen/frame assembly for an electrochemical cell. The screen functions as a gas diffusion member and is made of Nb, Ni, Co, Zr, Ti, steel, or Ti.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the materials of Speranza et al. in the flow field members of Wilson. The disclosure of Speranza et al. indicates that Nb, Ni, Co, Zr, Ti, steel, or Ti. are suitable materials for use as flow field members. The selection of a known material based on its suitability for its intended use has generally been held to be *prima facie* obvious (MPEP §2144.07). As such, it would be obvious to use the materials of Speranza in the flow field member of Wilson (and thus Fuglevand).

4. Claims 15, 22-25 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand in view of WO 97/213287.

Fuglevand teaches a fuel cell comprising first and second electrodes (160), an electrolyte membrane (151), first and second flow fields, and porous flow field members (171, 172) in fluid communication with the flow fields (see Fig. 26). The member comprises a porous support having a series of layers (in layer 171) having a hydrophilicity gradient (see col.11, line 8). Layer 171 comprises particulate carbon and a hydrophobic polymer (e.g., PTFE) and/or a hydrophilic polymer (e.g., ionomer) and layer 172 comprises a carbon cloth integrated with polymer (see col. 9, line 42, col. 9, line 52, col. 10, line 66). Layer 171 comprises 20-90% of support material (i.e., particulate carbon). The reference further teaches that the layer 171 comprises a plurality of layers but does not expressly teach that the layers each have a different porosity, as recited in claims 15, 22 and 51.

WO '287 teaches a fuel cell comprising first and second electrodes, an electrolyte membrane, first and second flow fields (17), and porous flow field members (16) in fluid communication with the flow fields (see Figs. 2 and 8). The member comprises a porous support modified to provide hydrophilicity or hydrophobicity. The support can be made of electrically conductive carbon cloth and a polymer (i.e., PTFE or ion exchange resin) (page 12, line 1 et seq.). The member comprises two layers (18, 16), each having a different porosity (see col. 10, line 32 et seq.). Further, the reference teaches that the supports may comprise a titanium-based compound (see page 12, line 10).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of WO '287 vary the porosity across the plurality of layers of Fuglevand in addition to the hydrophobicity. At page 4, line 11, WO '287 teaches the following:

It has been discovered that the fuel cells of the fourth and fifth aspects of the invention as well as fuel cells prepared by the process of the sixth aspect of the invention are able to operate at a high current density at a relatively high voltage, have a relatively high power density, and provide a high power density even when operated under relatively low gas pressures.

As such, the artisan would be motivated by this disclosure to vary the porosity across the plurality of layers of Fuglevand. Further, it is noted that the reference teaches "at least two" portions with different mean pore sizes (e.g., page 3, line 26). This disclosure fairly suggests that the porous member may have more than two layers. As such, it would have been obvious to use a third support in the member in the fuel cell of Fuglevand, such support having a larger porosity than the second support (note teachings of increasing porosity on page 14, line 18 et seq. of WO '287). It is further noted that the duplication of parts is generally not considered to distinguish over a reference (MPEP §2144.04).

5. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand in view of WO '287 as applied to claims 15, 22-25 and 51 above, and further in view of Wilson '586.

Fuglevand does not expressly teach that the porous supports comprise metal screens or sintered metal cloths, as recited in claims 16 and 17.

As noted above, Wilson '586 teaches or fairly suggests metal screens and sintered metal cloths as supports in porous members for fuel cells.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the structures of Wilson '586 in the fuel cell of Fuglevand. The disclosure of Wilson '586 indicates that metal screens and sintered metal cloths are functionally equivalent to carbon cloths when used in porous current-collecting members for fuel cells. As such, it would be obvious to substitute the metal screens or sintered metal cloths of Wilson '586 for the carbon paper of Fuglevand. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

### ***Response to Arguments***

6. Applicant's arguments filed March 6, 2006 have been fully considered but they are not persuasive. The position is maintained that carbon cloths and metal screens are functional equivalents when used in a fuel cell flow field member. Applicant's point is well-taken that the references do not expressly identify these as functional equivalents. However, it is submitted



that the skilled artisan would recognize them to function as equivalents since they both are electrically conductive, porous structures. In addition, it is submitted that the Wilson reference at least identifies metal screens as being suitable for use in a flow field member. Pursuant to MPEP 2144.07, the selection of a known material based on its suitability for its intended use has generally been held to be *prima facie* obvious. As previously stated, absent a showing of new or unexpected results for using the claimed porous support structures as opposed to a carbon cloth, the rejection over Fuglevand in view of Wilson and Speranza is believed to be proper.

Regarding the rejection over Fuglevand in view of Mussell et al., the Examiner's comments from the previous Office action remain applicable herein. Furthermore, Applicant states that the combination of references represents an "obvious to try" rationale. However, this is not believed to be the case here. The Mussell references disclose a specific structure, and gives reasons why that structure is advantageous. The artisan could clearly follow these teachings in applying the Mussell reference to another reference, i.e., Fuglevand. As stated in MPEP 2145(X), "[i]n some cases, what would have been obvious to try would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful.... In others, what was obvious to try was to explore a new technology or general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it." *In re O'Farrell*, 853 F.2d 894, 903, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988). In the instant case, the prior art references disclose

specific structures and provide the requisite motivation for their combination. As such, it is believed that an “obvious to try” situation does not exist and the rejection is proper.

### *Conclusion*

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau  
Primary Examiner  
Art Unit 1746  
May 4, 2006